

FALL 2016 McNABB GDCTM CONTEST
ALGEBRA ONE

NO Calculators Allowed

1. Jerry has five times as many comic books as Tom. If Jerry has forty-five comic books, how many does Tom have?
2. Jane was born in the year 2003. When she was born, her Mom was 26 years old. In what year will Jane's Mom be three times older than her?

3. Simplify

$$5x^2 - 7x + 3 - 3(x + 4)^2$$

4. John has some nickels and quarters, 37 coins in all. If the value of these coins is \$4.45, how many more nickels than quarters does John have?

5. If $a \star b = \frac{a+b}{a+3b}$, find the value of x that satisfies

$$2 \star (x \star 3) = 4$$

6. In how many ways can one arrange the letters of WINTER in such a way that the two vowels are never adjacent?
7. A theatre priced adult tickets to its play eight dollars higher than child tickets. At a certain performance, the theatre sold 75 more child tickets than adult tickets, for a total sales of \$1975. How much would the total sales have been if the prices of the child and adult tickets had been reversed?

8. How many zero's does the number $23! + 24!$ end in?

9. For how many integers k does the polynomial in x given by

$$4x^2 + kx - 9$$

factor over the integers?

10. Jorge has 57 coins with a total value of 90 cents. The coins are all pennies, nickels, or dimes. How many nickels does he have?
11. Six mathletes and two coaches sit at a circular table. If the two coaches sit across the table from each other, how many arrangements are possible?
12. Solve the system

$$\begin{cases} 13x + 14y &= 15 \\ 12x + 13y &= 14 \end{cases}$$

13. What is the ten's digit of 11^{2016} ?

14. Determine the sum of all the solutions of the equation

$$|x - 1| + |x| + |x + 1| = |4x|$$

15. If r and s are the roots of $2x^2 = x + 10$, find the value of $r^2 + s^2$.